Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the

application:

Listing of Claims:

5   1 – 168. (canceled)

Claim 169 (currently amended): A computer system comprising:

a host entity for issuing IO requests;

a redundant external storage virtualization controller (SVC) pair for performing

10   IO operations in response to IO requests issued by the host entity comprising

a first and a second external storage virtualization controller coupled to the

host entity; and

a set of at least one physical storage device for providing storage to the computer

system, with at least one member of said set of at least one physical storage

15   device comprising a PSD coupled to the said redundant storage virtualization

controller pair through a point-to-point serial signal interconnect;

wherein when one storage virtualization controller in the said redundant SVC

pair is not on line or goes off line after being on line, the other ~~alternate~~

storage virtualization controller in the said redundant SVC pair will

20   automatically take over the functionality originally performed by the said one

storage virtualization controller in the redundant SVC pair; and

wherein in the redundant storage virtualization controller pair, each of the

storage virtualization controllers further comprises:

a central processing circuitry for performing the IO operations in response to the

25   IO requests of said host entity;

at least one IO device interconnect controller coupled to said central processing

circuitry;

at least one host-side IO device interconnect port provided in a said at least one

IO device interconnect controller for coupling to said host entity; and

30   at least one device-side IO device interconnect port provided in a said at least

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one IO device interconnect controller coupled to said at least one physical storage device through [[a]] said point-to-point serial-signal interconnect.

Claim 170 (previously presented): The redundant storage virtualization computer system of claim 169 wherein said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

Claim 171 (previously presented): The storage virtualization computer system of one of claims 169 and 170 wherein a said host-side IO device interconnect port and a said device-side IO device interconnect port are provided in the same said IO device interconnect controller.

Claim 172 (previously presented): The storage virtualization computer system of one of claims 169 and 170 wherein a said host-side IO device interconnect port and a said device-side IO device interconnect port are provided in different said IO device interconnect controllers.

Claim 173 (currently amended): A redundant storage virtualization subsystem for providing storage to a host entity, comprising:
a redundant external storage virtualization controller (SVC) pair for performing IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host entity; and
a set of at least one physical storage device for providing storage to the host entity, with at least one member of said set of at least one physical storage device comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;
wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the other alternate storage virtualization controller in the said redundant SVC pair will

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automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair;

wherein for each of at least one of the said physical storage devices, the redundant storage virtualization subsystem further comprises an access control switch coupled between said physical storage device and the redundant storage virtualization controller pair for selectively switching the connection of the said physical storage device to the redundant SVC pair between the first and the second storage virtualization controller; and

wherein at least one said PSD together with said access control switch is installed in a canister removably attached to the redundant storage virtualization subsystem.

Claim 174 (previously presented): The redundant storage virtualization subsystem of claim 173 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

Claim 175 (currently amended): A redundant storage virtualization subsystem for providing storage to a host entity, comprising:

a redundant external storage virtualization controller (SVC) pair for performing IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host entity; and

a set of at least one physical storage device for providing storage to the host entity, with at least one member of said set of at least one physical storage device comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;

wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the other ~~alternate~~ storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one

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storage virtualization controller in the redundant SVC pair;

wherein for each of at least one of the said physical storage devices, the redundant storage virtualization subsystem further comprises an access control switch coupled between said physical storage device and the redundant storage virtualization controller pair for selectively switching the connection of the said physical storage device to the redundant SVC pair between the first and the second storage virtualization controller; and

wherein said access control switch coupled between a said physical storage device and the redundant storage virtualization controller pair selectively allows patching through of the serial signal of the said physical storage device to and from the first SVC when in a first patching state of said access control switch and to and from the second SVC when in a second patching state of said access control switch.

Claim 176 (previously presented): The redundant storage virtualization subsystem of claim 175 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

Claim 177 (previously presented): The redundant storage virtualization subsystem of one of claims 175 and 176, wherein an access ownership arbitration mechanism is provided between said SVC pair and said access control switch to control the patching state of said access control switch.

Claim 178 (previously presented): The redundant storage virtualization subsystem of claim 177, wherein said access ownership arbitration mechanism comprises a pair of access request signal lines coupled between said SVC pair; said first SVC being active on a first of said access request signal line pair and passive on a second of said access request signal line pair; said second SVC being active on said second and passive on said first of said access request signal line pair; and said SVC pair each being capable of issuing an access request

signal on its own said active access request signal line, and reading a requesting state on its own said passive access request signal line and identifying a change of said requesting state since previous reading on its own said passive access request signal line.

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Claim 179 (currently amended): The redundant storage virtualization subsystem of claim 177, wherein said access ownership arbitration mechanism includes an access ownership detecting mechanism to determine if an access ownership is possessed by a said SVC.

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Claim 180 (currently amended): The redundant storage virtualization subsystem of claim 177, wherein said access ownership arbitration mechanism includes an access ownership granting mechanism to grant said access ownership when said access ownership is requested by a said SVC.

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Claim 181 (currently amended): The redundant storage virtualization subsystem of claim 177, wherein said access ownership arbitration mechanism comprises an access ownership arbitration circuit (AOAC) coupled to said first and second SVCs and said access control switch, and wherein if said first SVC

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issues a first access ownership request signal received by said AOAC, said access ownership will be granted to said first SVC when said second SVC does not already possess the access ownership, and if said second SVC issues a second access ownership request signal received by said AOAC, said access ownership will be granted to said second SVC when said first SVC does not

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already possess the access ownership.

Claim 182 (currently amended) The redundant storage virtualization subsystem of claim 181, further comprises an access ownership determining mechanism whereby when said first and said second SVC concurrently issue said first and

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second access ownership request signals to said AOAC, said access

ownership will be granted to a predetermined one of said SVC pair.

Claim 183 (currently amended): A redundant storage virtualization subsystem for providing storage to a host entity, comprising:

5   a redundant external storage virtualization controller (SVC) pair for performing IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host entity; and

        a set of at least one physical storage device for providing storage to the host

10   entity, with at least one member of said set of at least one physical storage device comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;

        wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the other ~~alternate~~

15   storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair;

        wherein for each of at least one of the said physical storage devices, the redundant storage virtualization subsystem further comprises an access

20   control switch coupled between said physical storage device and the redundant storage virtualization controller pair for selectively switching the connection of the said physical storage device to the redundant SVC pair between the first and the second storage virtualization controller; and

        further comprising a cooperating mechanism for the redundant SVC pair to

25   cooperatively control a patching state of said access control switch; a monitoring mechanism for each SVC of said SVC pair to monitor status of the other SVC of said SVC pair; and, a state control mechanism for each SVC of said SVC pair to forcibly take complete control of said access control switch independent of the state of the other SVC of said SVC pair.

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Claim 184 (previously presented): The redundant storage virtualization subsystem of claim 183 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

5 Claim 185 (currently amended): A redundant storage virtualization subsystem for providing storage to a host entity, comprising:

a redundant external storage virtualization controller (SVC) pair for performing IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host

10 entity; and

a set of at least one physical storage device for providing storage to the host entity, with at least one member of said set of at least one physical storage device comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;

15 wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the other ~~alternate~~ storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair; and

20 wherein in the redundant storage virtualization controller pair, each of the storage virtualization controllers further comprises:

a central processing circuitry for performing IO operations in response to IO requests of said host entity;

at least one IO device interconnect controller coupled to said central processing

25 circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller coupled to at least one physical

30 storage device through [[a]] said point-to-point serial-signal interconnect.

Claim 186 (previously presented): The redundant storage virtualization subsystem of claim 185 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

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Claim 187 (previously presented): The redundant storage virtualization subsystem of one of claims 185 and 186 wherein a said host-side IO device interconnect port and a said device-side IO device interconnect port are provided in the same said IO device interconnect controller.

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Claim 188 (previously presented): The redundant storage virtualization subsystem of one of claims 185 and 186 wherein a said host-side IO device interconnect port and a said device-side IO device interconnect port are provided in different said IO device interconnect controllers.

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Claim 189 (previously presented): The redundant storage virtualization subsystem of one of claims 185 and 186, wherein a logical media unit that is presented to said host entity through a first said host-side IO device interconnect port is also redundantly presented through a second said host-side IO device interconnect

20   port.

Claim 190 (previously presented): The redundant storage virtualization subsystem of claim 189, wherein the first said host-side IO device interconnect port and the second said host-side IO device interconnect port are IO device interconnect

25   ports of the same one SVC in the redundant SVC pair.

Claim 191 (previously presented): The redundant storage virtualization subsystem of claim 189, wherein the first said host-side IO device interconnect port is an IO device interconnect port of one SVC in the redundant SVC pair and the second

30   said host-side IO device interconnect port is an IO device interconnect port of the

other SVC in the redundant SVC pair.

Claim 192 (previously presented): The redundant storage virtualization subsystem of claim 189, wherein the first said host-side IO device interconnect port and the second said host-side IO device interconnect port are coupled to the same host-side IO device interconnect.

Claim 193 (previously presented): The redundant storage virtualization subsystem of claim 192, wherein the first said host-side IO device interconnect port and the second said host-side IO device interconnect port are coupled to the said same host-side IO device interconnect through a switch circuit.

Claim 194 (previously presented): The redundant storage virtualization subsystem of claim 189, wherein the first said host-side IO device interconnect port and the second said host-side IO device interconnect port are each coupled to a different host-side IO device interconnect.

Claim 195 (previously presented): The redundant storage virtualization subsystem of one of claims 185 and 186, wherein at least one said host-side IO device interconnect port is Fibre Channel supporting point-to-point connectivity in target mode.

Claim 196 (previously presented): The redundant storage virtualization subsystem of one of claims 185 and 186, wherein at least one said host-side IO device interconnect port is Fibre Channel supporting public loop connectivity in target mode.

Claim 197 (previously presented): The redundant storage virtualization subsystem of one of claims 185 and 186, wherein at least one said host-side IO device interconnect port is Fibre Channel supporting private loop connectivity in target

mode.

Claim 198 (previously presented): The redundant storage virtualization subsystem of
one of claims 185 and 186, wherein at least one said host-side IO device
interconnect port is parallel SCSI operating in target mode.

Claim 199 (previously presented): The redundant storage virtualization subsystem of
one of claims 185 and 186, wherein at least one said host-side IO device
interconnect port is ethernet supporting the iSCSI protocol operating in target
mode.

Claim 200 (previously presented): The redundant storage virtualization subsystem of
one of claims 185 and 186, wherein at least one said host-side IO device
interconnect port is Serial-Attached SCSI (SAS) operating in target mode.

Claim 201 (previously presented): The redundant storage virtualization subsystem of
one of claims 185 and 186, wherein at least one said host-side IO device
interconnect port is Serial ATA operating in target mode.

Claim 202 (currently amended): A redundant storage virtualization subsystem for
providing storage to a host entity, comprising:
a redundant external storage virtualization controller (SVC) pair for performing
IO operations in response to IO requests issued by the host entity comprising
a first and a second storage virtualization controller for coupling to the host
entity; and
a set of at least one physical storage device for providing storage to the host
entity, with at least one member of said set of at least one physical storage
device comprising a PSD coupled to the said redundant storage virtualization
controller pair through a point-to-point serial signal interconnect;
wherein when one storage virtualization controller in the said redundant SVC

pair is not on line or goes off line after being on line, the other ~~alternate~~ storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair; and

5   wherein an inter-controller communication channel is provided between the two SVCs in said redundant SVC pair for communicating state synchronization information.

Claim 203 (previously presented):   The redundant storage virtualization subsystem of

10   claim 202 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

Claim 204 (previously presented):   The redundant storage virtualization subsystem of one of claims 202 and 203, wherein said inter-controller communication

15   channel is an existing IO device interconnect, whereby inter-controller communication exchange is multiplexed with IO requests and associated data.

Claim 205 (previously presented):   The redundant storage virtualization subsystem of one of claims 202 and 203, wherein said inter-controller communication

20   channel is a dedicated channel the primary function thereof is to exchange said state synchronization information.

Claim 206 (previously presented):   The redundant storage virtualization subsystem of one of claims 202 and 203, wherein said inter-controller communication

25   channel is Fibre Channel.

Claim 207 (previously presented):   The redundant storage virtualization subsystem of one of claims 202 and 203, wherein said inter-controller communication channel is Serial ATA.

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Claim 208 (previously presented): The redundant storage virtualization subsystem of one of claims 202 and 203, wherein said inter-controller communication channel is Parallel SCSI.

5 Claim 209 (previously presented): The redundant storage virtualization subsystem of one of claims 202 and 203, wherein said inter-controller communication channel is Ethernet.

Claim 210 (previously presented): The redundant storage virtualization subsystem of 10 one of claims 202 and 203, wherein said inter-controller communication channel is Serial-Attached SCSI (SAS).

Claim 211 (previously presented): The redundant storage virtualization subsystem of one of claims 202 and 203, wherein said inter-controller communication 15 channel is I2C.

Claim 212 (currently amended): A redundant storage virtualization subsystem for providing storage to a host entity, comprising:
a redundant external storage virtualization controller (SVC) pair for performing 20 IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host entity; and
a set of at least one physical storage device for providing storage to the host entity, with at least one member of said set of at least one physical storage 25 device comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;
wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the other ~~alternate~~ storage virtualization controller in the said redundant SVC pair will 30 automatically take over the functionality originally performed by the said one

storage virtualization controller in the redundant SVC pair; and

wherein said redundant SVC pair can perform IO request rerouting function.

5   Claim 213 (previously presented): The redundant storage virtualization subsystem of claim 212 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

Claim 214 (currently amended): A redundant storage virtualization subsystem for providing storage to a host entity, comprising:

10   a redundant external storage virtualization controller (SVC) pair for performing IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host entity; and

a set of at least one physical storage device for providing storage to the host

15   entity, with at least one member of said set of at least one physical storage device comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;

wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the other ~~alternate~~

20   storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair; and

wherein said redundant SVC pair can perform PSD access ownership transfer function.

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Claim 215 (previously presented): The redundant storage virtualization subsystem of claim 214 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

30   Claim 216 (currently amended): A redundant storage virtualization subsystem for

providing storage to a host entity, comprising:

a redundant external storage virtualization controller (SVC) pair for performing IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host entity; and

a set of at least one physical storage device for providing storage to the host entity, with at least one member of said set of at least one physical storage device comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;

wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the other ~~alternate~~ storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair; and

wherein at least one member SVC of said redundant SVC pair includes at least one expansion port for coupling to a second set of at least one PSD through a multiple-device device-side IO device interconnect.

Claim 217 (previously presented):   The redundant storage virtualization subsystem of claim 216 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

Claim 218 (previously presented):   The redundant storage virtualization subsystem of one of claims 216 and 217, wherein members of a set of at least one said expansion port are mutually coupled together and to the said second set of at least one PSD through a switch circuit.

Claim 219 (previously presented):   The redundant storage virtualization subsystem of one of claims 216 and 217, wherein members of a set of at least one said expansion port are mutually coupled together and to the said second set of at least

one PSD directly without intervening circuitry.

Claim 220 (previously presented):   The redundant storage virtualization subsystem of one of claims 216 and 217, wherein a set of at least two said expansion ports form a redundant expansion port set for mutually performing IO request rerouting function whereby IO requests normally delivered to a PSD through a first member port of said redundant expansion port set may be rerouted through a second member port of said redundant expansion port set.

Claim 221 (previously presented):   The redundant storage virtualization subsystem of one of claims 216 and 217, wherein a member of said second set of at least one PSD has a pair of redundant ports with a member port of said redundant port pair being coupled to a set of at least one said expansion port.

Claim 222 (previously presented):   The redundant storage virtualization subsystem of claim 221, wherein IO request rerouting function can be performed through said redundant ports of said member of said second set of at least one PSD whereby IO requests normally delivered to a PSD through a first member port of said redundant port pair may be rerouted to said PSD through a second member port of said redundant port pair.

Claim 223 (previously presented):   The redundant storage virtualization subsystem of claim 222, wherein a set of at least two said expansion ports form a redundant expansion port set for mutually performing IO request rerouting function whereby IO requests normally delivered to a PSD through a first member port of said redundant expansion port set may be rerouted through a second member port of said redundant expansion port set.

Claim 224 (previously presented):   The redundant storage virtualization subsystem of claim 221, wherein each member port in the said PSD redundant port pair is

coupled to a different set of at least one expansion port.

Claim 225 (previously presented): The redundant storage virtualization subsystem of claim 221, wherein said member port of redundant PSD port pair and said set of at least one said expansion port are mutually coupled together through a switch circuit.

Claim 226 (previously presented): The redundant storage virtualization subsystem of claim 225, wherein said set of at least one expansion port comprises a first and a second expansion port subset forming a pair of complementary subsets with at least one member expansion port per subset.

Claim 227 (previously presented): The redundant storage virtualization subsystem of claim 226, wherein one of the interconnect signal line switching mechanisms implemented by said switch circuit is the coupling of said first subset of the said complementary subset pair to a first member port of said PSD redundant port pair and coupling of said second subset of the said complementary subset pair to a second member port of said PSD redundant port pair.

Claim 228 (previously presented): The redundant storage virtualization subsystem of claim 226, wherein one of the interconnect signal line switching mechanisms implemented by said switch circuit is the coupling of both subsets of the said complementary subset pair to a first member port of said PSD redundant port pair.

Claim 229 (previously presented): The redundant storage virtualization subsystem of claim 226, wherein one of the interconnect signal line switching mechanisms implemented by said switch circuit is the coupling of said first subset of the said complementary subset pair to a first member port of said PSD redundant port pair.

Claim 230 (previously presented): The redundant storage virtualization subsystem of claim 226, wherein said switch circuit implements an interconnect signal line switching mechanism that supports all of the following arrangements:

5   (1) coupling of said first subset of the said complementary subset pair to a first member port of said PSD redundant port pair and coupling of said second subset of the said complementary subset pair to a second member port of said PSD redundant port pair;

        (2) coupling of both subsets of the said complementary subset pair to said first

10   member port of said PSD redundant port pair;

        (3) coupling of both subsets of the said complementary subset pair to said second member port of said PSD redundant port pair;

        (4) coupling of said first subset of the said complementary subset pair to said first member port of said PSD redundant port pair;

15   (5) coupling of said second subset of the said complementary subset pair to said second member port of said PSD redundant port pair;

        (6) coupling of said second subset of the said complementary subset pair to said first member port of said PSD redundant port pair; and,

        (7) coupling of said first subset of the said complementary subset pair to said

20   second member port of said PSD redundant port pair.

Claim 231 (previously presented): The redundant storage virtualization subsystem of claim 221, wherein said member port of redundant PSD port pair and said set of at least one said expansion port are directly coupled together without

25   intervening circuitry.

Claim 232 (previously presented): The redundant storage virtualization subsystem of claim 221, wherein a member SVC of the redundant SVC pair further comprises at least two said expansion ports forming a redundant expansion port set.

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Claim 233 (previously presented): The redundant storage virtualization subsystem of claim 232, wherein a first and a second member port in the said redundant expansion port set are each coupled to a different one of member ports in redundant PSD port pair of a member PSD of said second set of at least one PSD.

Claim 234 (previously presented): The redundant storage virtualization subsystem of claim 232, wherein a first and a second member port in the said redundant expansion port set are both coupled to the same one of member ports in redundant PSD port pair of a member PSD of said second set of at least one PSD.

Claim 235 (previously presented): The redundant storage virtualization subsystem of claim 234, wherein said first and said second member port are directly connected to the same one of member ports in redundant PSD port pair of a member of said second set of at least one PSD without intervening circuitry.

Claim 236 (previously presented): The redundant storage virtualization subsystem of claim 221 comprising:

a first expansion port set comprising at least one said expansion port on the first SVC in the redundant SVC pair;

a second expansion port set comprising at least one said expansion port on the second SVC in the redundant SVC pair;

wherein said first expansion port set and said second expansion port set together form a redundant expansion port set pair.

Claim 237 (previously presented): The redundant storage virtualization subsystem of claim 236 wherein said first expansion port set and said second expansion port set are each coupled to a different one of member ports in redundant PSD port pair of each PSD of said second set of at least one PSD.

Claim 238 (previously presented):   The redundant storage virtualization subsystem of claim 236, wherein said first expansion port set and said second expansion port set are both coupled to the same one of member ports in redundant PSD port

5   pair of each PSD of said second set of at least one PSD.

Claim 239 (previously presented):   The redundant storage virtualization subsystem of one of claims 216 and 217, wherein at least one said expansion port is Fibre Channel.

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Claim 240 (previously presented):   The redundant storage virtualization subsystem of one of claims 216 and 217, wherein at least one said expansion port is Parallel SCSI.

15   Claim 241 (previously presented):   The redundant storage virtualization subsystem of one of claims 216 and 217, wherein at least one said expansion port is Serial ATA.

Claim 242 (previously presented):   The redundant storage virtualization subsystem of

20   one of claims 216 and 217, wherein at least one said expansion port is Ethernet.

Claim 243 (previously presented):   The redundant storage virtualization subsystem of one of claims 216 and 217, wherein at least one said expansion port is Serial-Attached SCSI (SAS).

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Claim 244 (currently amended):   A redundant storage virtualization subsystem for providing storage to a host entity, comprising:
        a redundant external storage virtualization controller (SVC) pair for performing
            IO operations in response to IO requests issued by the host entity comprising

30   a first and a second storage virtualization controller for coupling to the host

entity; and

a set of at least one physical storage device for providing storage to the host entity, with at least one member of said set of at least one physical storage device comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;

wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the other ~~alternate~~ storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair;

wherein in the redundant storage virtualization controller pair, each of the storage virtualization controllers further comprises:

a central processing circuitry for performing IO operations in response to IO requests of said host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller coupled to at least one physical storage device through said point-to-point serial-signal interconnect; and

wherein said PSD is a SATA PSD.

Claim 245 (previously presented): The redundant storage virtualization subsystem of claim 244 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

Claim 246 (currently amended): A redundant storage virtualization subsystem for providing storage to a host entity, comprising:

a redundant external storage virtualization controller (SVC) pair for performing

IO operations in response to IO requests issued by the host entity comprising

a first and a second storage virtualization controller for coupling to the host

entity; and

5   a set of at least one physical storage device for providing storage to the host

entity, with at least one member of said set of at least one physical storage

device comprising a PSD coupled to the said redundant storage virtualization

controller pair through a point-to-point serial signal interconnect;

wherein when one storage virtualization controller in the said redundant SVC

10   pair is not on line or goes off line after being on line, the other ~~alternate~~

storage virtualization controller in the said redundant SVC pair will

automatically take over the functionality originally performed by the said one

storage virtualization controller in the redundant SVC pair;

wherein in the redundant storage virtualization controller pair, each of the

15   storage virtualization controllers further comprises:

a central processing circuitry for performing IO operations in response to IO

requests of said host entity;

at least one IO device interconnect controller coupled to said central

processing circuitry;

20   at least one host-side IO device interconnect port provided in a said at least

one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least

one IO device interconnect controller coupled to at least one physical storage

device through said point-to-point serial-signal interconnect; and

25   wherein said PSD is a PATA PSD.

Claim 247 (previously presented):   The redundant storage virtualization subsystem of

claim 246 wherein the said point-to-point serial signal interconnect is a Serial

ATA IO device interconnect.

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Claim 248 (currently amended): A redundant storage virtualization subsystem for providing storage to a host entity, comprising:

a redundant external storage virtualization controller (SVC) pair for performing IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host entity; and

a set of at least one physical storage device for providing storage to the host entity, with at least one member of said set of at least one physical storage device comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;

wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the other ~~alternate~~ storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair; and

wherein each SVC in said redundant SVC pair includes a state-defining circuit for forcing externally connected signal lines of said the other ~~alternate~~ SVC in said redundant SVC pair to a predetermined state.

Claim 249 (previously presented): The redundant storage virtualization subsystem of claim 248 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

Claim 250 (currently amended): A redundant storage virtualization subsystem for providing storage to a host entity, comprising:

a redundant external storage virtualization controller (SVC) pair for performing IO operations in response to IO requests issued by the host entity comprising a first and a second storage virtualization controller for coupling to the host entity; and

a set of at least one physical storage device for providing storage to the host

entity, with at least one member of said set of at least one physical storage device comprising a PSD coupled to the said redundant storage virtualization controller pair through a point-to-point serial signal interconnect;

wherein when one storage virtualization controller in the said redundant SVC pair is not on line or goes off line after being on line, the other ~~alternate~~ storage virtualization controller in the said redundant SVC pair will automatically take over the functionality originally performed by the said one storage virtualization controller in the redundant SVC pair; and

wherein each SVC of said redundant SVC pair includes a self-killing circuit for forcing its own externally connected signal lines to a predetermined state.

Claim 251 (previously presented): The redundant storage virtualization subsystem of claim 250 wherein the said point-to-point serial signal interconnect is a Serial ATA IO device interconnect.

Claim 252 (currently amended): An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the other ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization controller pair when said the other ~~alternate~~ external storage virtualization

controller is not on line or goes off line after being on line; and

wherein a said host-side IO device interconnect port and a said device-side IO device interconnect port are provided in the same said IO device interconnect controller.

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Claim 253 (currently amended): An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

10   at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port pro vided in a said at least

15   one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the other ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization

20   controller pair when said the other ~~alternate~~ external storage virtualization controller is not on line or goes off line after being on line; and

wherein a said host-side IO device interconnect port and a said device-side IO device interconnect port are provided in different said IO device interconnect controllers.

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Claim 254 (currently amended): An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

30   at least one IO device interconnect controller coupled to said central processing

circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the other ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization controller pair when said the other ~~alternate~~ external storage virtualization controller is not on line or goes off line after being on line; and

further comprising a detection mechanism for detecting an off-line or failed state of said the other ~~alternate~~ storage virtualization controller.

Claim 255 (previously presented): The storage virtualization controller of claim 254 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

Claim 256 (currently amended): An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the other ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization controller pair when said the other ~~alternate~~ external storage virtualization

5   controller is not on line or goes off line after being on line; and

wherein the said SVC includes a state-defining circuit for forcing externally connected signal lines of said the other ~~alternate~~ SVC in said redundant SVC pair to a predetermined state.

10   Claim 257 (previously presented): The storage virtualization controller of claim 256 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

15   Claim 258 (currently amended): An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing

20   circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial

25   signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the other ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization controller pair when said the other ~~alternate~~ external storage virtualization

30   controller is not on line or goes off line after being on line; and

wherein said SVC includes a self-killing circuit for forcing its own externally connected signal lines to a predetermined state.

Claim 259 (previously presented):   The storage virtualization controller of claim 258 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

Claim 260 (currently amended):   An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the other ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization controller pair when said the other ~~alternate~~ external storage virtualization controller is not on line or goes off line after being on line; and

wherein said functionality includes presenting and making available to the host entity accessible resources that were originally presented and made available by said the other ~~alternate~~ storage virtualization controller as well as accessible resources that were presented and made available by said storage virtualization controller itself.

Claim 261 (previously presented): The storage virtualization controller of claim 260 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

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Claim 262 (currently amended): An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

10   at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least

15   one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the other ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization

20   controller pair when said the other ~~alternate~~ external storage virtualization controller is not on line or goes off line after being on line; and

wherein an access ownership arbitration mechanism is provided to determine which SVC in said SVC pair possesses an access ownership.

25   Claim 263 (previously presented): The storage virtualization controller of claim 262 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

30   Claim 264 (currently amended): The storage virtualization controller of one of

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claims 262 and 263, wherein said access ownership arbitration mechanism includes an access ownership detecting mechanism to determine if said access ownership is possessed by said SVC.

5   Claim 265 (currently amended):   The storage virtualization controller of one of claims 262 and 263, wherein said access ownership arbitration mechanism includes an access ownership granting mechanism to said grant access ownership when said access ownership is requested by a said SVC.

10   Claim 266 (currently amended):   An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing

15   circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

20   wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the other ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization controller pair when said the other ~~alternate~~ external storage virtualization

25   controller is not on line or goes off line after being on line; and

further comprising a cooperating mechanism for the redundant SVC pair to cooperatively control a patching state of an access control switch together with said the other ~~alternate~~ SVC; a monitoring mechanism for the said SVC of said SVC pair to monitor status of said the other ~~alternate~~ SVC of said SVC

30   pair; and, a state control mechanism for said SVC to forcibly take complete

control of said access control switch independent of the state of said the other
~~alternate~~ SVC of said SVC pair.

Claim 267 (previously presented): The storage virtualization controller of claim 266

5   wherein the a said at least one device-side IO device interconnect port comprises a
Serial ATA interconnect port for connecting to a said physical storage device
through a Serial ATA IO device interconnect.

Claim 268 (currently amended): An external storage virtualization controller for use

10   in a redundant storage virtualization controller pair, comprising:
a central processing circuitry for performing IO operations in response to IO
requests of a host entity;
at least one IO device interconnect controller coupled to said central processing
circuitry;

15   at least one host-side IO device interconnect port provided in a said at least one
IO device interconnect controller for coupling to said host entity; and
at least one device-side IO device interconnect port provided in a said at least
one IO device interconnect controller for performing point-to-point serial
signal transmission with at least one physical storage devices;

20   wherein the said external storage virtualization controller will automatically take
over the functionality originally performed by the other ~~alternate~~ external
storage virtualization controller in the said redundant storage virtualization
controller pair when said the other ~~alternate~~ external storage virtualization
controller is not on line or goes off line after being on line; and

25   wherein an inter-controller communication port is provided for communicating
state synchronization information between the said SVC and said the other
~~alternate~~ SVC in said redundant SVC pair.

Claim 269 (previously presented): The storage virtualization controller of claim 268

30   wherein the a said at least one device-side IO device interconnect port comprises

a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

Claim 270 (previously presented): The storage virtualization controller of one of claims 268 and 269, wherein said inter-controller communication port is an existing IO device interconnect port, whereby inter-controller communication exchange is multiplexed with IO requests and associated data.

Claim 271 (previously presented): The storage virtualization controller of one of claims 268 and 269, wherein said inter-controller communication port is a dedicated port the primary function thereof is to exchange said state synchronization information.

Claim 272 (previously presented): The storage virtualization controller of one of claims 268 and 269, wherein said inter-controller communication port is Fibre Channel.

Claim 273 (previously presented): The storage virtualization controller of one of claims 268 and 269, wherein said inter-controller communication port is Serial ATA.

Claim 274 (previously presented): The storage virtualization controller of one of claims 268 and 269, wherein said inter-controller communication port is Parallel SCSI.

Claim 275 (previously presented): The storage virtualization controller of one of claims 268 and 269, wherein said inter-controller communication port is Ethernet.

Claim 276 (previously presented): The storage virtualization controller of one of

claims 268 and 269, wherein said inter-controller communication port is Serial-Attached SCSI (SAS).

Claim 277 (previously presented): The storage virtualization controller of one of
5   claims 268 and 269, wherein said inter-controller communication port is I2C.

Claim 278 (currently amended): An external storage virtualization controller for use
     in a redundant storage virtualization controller pair, comprising:
     a central processing circuitry for performing IO operations in response to IO
10   requests of a host entity;
     at least one IO device interconnect controller coupled to said central processing
         circuitry;
     at least one host-side IO device interconnect port provided in a said at least one
         IO device interconnect controller for coupling to said host entity; and
15   at least one device-side IO device interconnect port provided in a said at least
         one IO device interconnect controller for performing point-to-point serial
         signal transmission with at least one physical storage devices;
     wherein the said external storage virtualization controller will automatically take
         over the functionality originally performed by the <u>other</u> ~~alternate~~ external
20   storage virtualization controller in the said redundant storage virtualization
         controller pair when said <u>the other</u> ~~alternate~~ external storage virtualization
         controller is not on line or goes off line after being on line; and
     wherein said SVC can perform IO request rerouting function.

25   Claim 279 (previously presented): The storage virtualization controller of claim 278
     wherein the a said at least one device-side IO device interconnect port comprises a
     Serial ATA interconnect port for connecting to a said physical storage device
     through a Serial ATA IO device interconnect.

30   Claim 280 (currently amended): An external storage virtualization controller for use

in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the other ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization controller pair when said the other ~~alternate~~ external storage virtualization controller is not on line or goes off line after being on line; and

wherein said SVC can perform PSD access ownership transfer function.

Claim 281 (previously presented):   The storage virtualization controller of claim 280 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

Claim 282 (currently amended):   An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the other ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization controller pair when said the other ~~alternate~~ external storage virtualization controller is not on line or goes off line after being on line; and

wherein said SVC includes an expansion port for coupling to a second set of at least one PSD through multiple-device device-side IO device interconnects.

Claim 283 (previously presented): The storage virtualization controller of claim 282 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

Claim 284 (currently amended): An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the other ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization

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controller pair when said <u>the other</u> ~~alternate~~ external storage virtualization controller is not on line or goes off line after being on line; and

wherein at least one said host-side IO device interconnect port is Fibre Channel supporting point-to-point connectivity in target mode.

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Claim 285 (previously presented): The storage virtualization controller of claim 284 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

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Claim 286 (currently amended): An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

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at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least

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one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the <u>other</u> ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization

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controller pair when said <u>the other</u> ~~alternate~~ external storage virtualization controller is not on line or goes off line after being on line; and

wherein at least one said host-side IO device interconnect port is Fibre Channel supporting public loop connectivity in target mode.

30   Claim 287 (previously presented): The storage virtualization controller of claim 286

wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

5   Claim 288 (currently amended):   An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing

10   circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial

15   signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the other ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization controller pair when said the other ~~alternate~~ external storage virtualization

20   controller is not on line or goes off line after being on line; and

wherein at least one said host-side IO device interconnect port is Fibre Channel supporting private loop connectivity in target mode.

Claim 289 (previously presented):   The storage virtualization controller of claim 288

25   wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

Claim 290 (currently amended):   An external storage virtualization controller for use

30   in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

5   at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

10   wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the <u>other</u> ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization controller pair when said <u>the other</u> ~~alternate~~ external storage virtualization controller is not on line or goes off line after being on line; and

15   wherein at least one said host-side IO device interconnect port is parallel SCSI operating in target mode.

Claim 291 (previously presented):   The storage virtualization controller of claim 290 wherein the a said at least one device-side IO device interconnect port comprises a

20   Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

Claim 292 (currently amended):   An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

25   a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in a said at least one

30   IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the other ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization controller pair when said the other ~~alternate~~ external storage virtualization controller is not on line or goes off line after being on line; and

wherein at least one said host-side IO device interconnect port is ethernet supporting the iSCSI protocol operating in target mode.

Claim 293 (previously presented): The storage virtualization controller of claim 292 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

Claim 294 (currently amended): An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the other ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization

controller pair when said <u>the other</u> ~~alternate~~ external storage virtualization controller is not on line or goes off line after being on line; and

wherein at least one said host-side IO device interconnect port is Serial-Attached SCSI (SAS) operating in target mode.

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Claim 295 (previously presented):   The storage virtualization controller of claim 294 wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

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Claim 296 (currently amended):   An external storage virtualization controller for use in a redundant storage virtualization controller pair, comprising:

a central processing circuitry for performing IO operations in response to IO requests of a host entity;

at least one IO device interconnect controller coupled to said central processing circuitry;

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at least one host-side IO device interconnect port provided in a said at least one IO device interconnect controller for coupling to said host entity; and

at least one device-side IO device interconnect port provided in a said at least one IO device interconnect controller for performing point-to-point serial signal transmission with at least one physical storage devices;

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wherein the said external storage virtualization controller will automatically take over the functionality originally performed by the <u>other</u> ~~alternate~~ external storage virtualization controller in the said redundant storage virtualization controller pair when said <u>the other</u> ~~alternate~~ external storage virtualization controller is not on line or goes off line after being on line; and

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wherein at least one said host-side IO device interconnect port is Serial ATA operating in target mode.

30   Claim 297 (previously presented):   The storage virtualization controller of claim 296

wherein the a said at least one device-side IO device interconnect port comprises a Serial ATA interconnect port for connecting to a said physical storage device through a Serial ATA IO device interconnect.

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